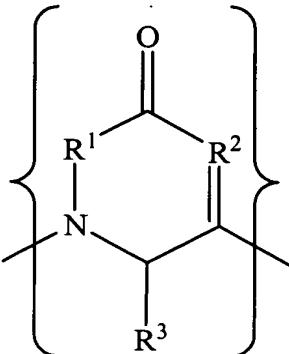


WHAT IS CLAIMED IS:

1 1. A peptide analog comprising a peptide in which at least one amino
2 acid, but less than all amino acids, is replaced by an azacyclohexenone group having the
3 formula



4
5 in which:

6 R¹ is CH₂ or NH,

7 R² is CH or N, and

8 R³ is H or an amino acid side chain,

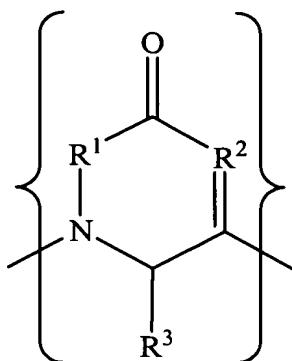
9 such that in at least one such azacyclohexenone group:

10 when R¹ is CH₂ and R² is CH, R³ is an amino acid side chain, and

11 when either R¹ is NH, or R² is N, or R¹ is NH and R² is N, R³ is H or an amino
12 acid side chain,

13 and when said peptide analog contains two or more azacyclohexenone groups of said
14 formula, R¹, R², and R³ of any one azacyclohexenone group in said peptide analog are either
15 the same as or different from R¹, R², and R³ of any other azacyclohexenone group in said
16 peptide analog.

1 2. A peptide analog comprising a peptide in which at least one amino
2 acid, but less than all amino acids, is replaced by an azacyclohexenone group having the
3 formula



4
5 in which:
6 R¹ is CH₂ or NH,
7 R² is CH or N, and
8 when R¹ is CH₂ and R² is CH, R³ is an amino acid side chain, and
9 when either R¹ is NH, or R² is N, or R¹ is NH and R² is N, R³ is H or an amino
10 acid side chain,
11 and when said peptide analog contains two or more azacyclohexenone groups of said
12 formula, R¹, R², and R³ of any one azacyclohexenone group in said peptide analog are either
13 the same as or different from R¹, R², and R³ of any other azacyclohexenone group in said
14 peptide analog.

- 1 **3.** The peptide analog of claims **1** or **2** in which R¹ is CH₂ and R² is N.
 - 1 **4.** The peptide analog of claims **1** or **2** in which R¹ is NH and R² is CH.
 - 1 **5.** The peptide analog of claims **1** or **2** in which R¹ is NH and R² is N.
 - 1 **6.** The peptide analog of claims **1** or **2** in which R¹ is CH₂ and R² is CH.
 - 1 **7.** The peptide analog of claims **1** or **2** in which said azacyclohexenone
2 group is an L-stereoisomer relative to R³ when R³ is an amino acid side chain.
 - 1 **8.** The peptide analog of claims **1** or **2** in which said amino acid side
2 chain is a side chain of a natural amino acid.
 - 1 **9.** The peptide analog of claims **1** or **2** in which said amino acid side
2 chain is a side chain of an unnatural amino acid.
 - 1 **10.** The peptide analog of claims **1** or **2** in which said amino acid side
2 chain is a member selected from the group consisting of C₁-C₆ alkyl, C₁-C₆ alkyl interrupted

3 by -O-, C₁-C₆ alkyl interrupted by -S-, hydroxy-(C₁-C₆ alkyl), carboxy-(C₁-C₆ alkyl), amino-
4 (C₁-C₆ alkyl), guanidino-(C₁-C₆ alkyl), carbamoyl-(C₁-C₆ alkyl), mercapto-(C₁-C₆ alkyl),
5 indolyl-(C₁-C₃ alkyl), phenyl-(C₁-C₃ alkyl), hydroxyphenyl-(C₁-C₆ alkyl), halophenyl-(C₁-C₆
6 alkyl), imidazolyl-(C₁-C₆ alkyl), phenyl, and sulfoximino-(C₁-C₆ alkyl).

1 **11.** The peptide analog of claims **1** or **2** in which said amino acid side
2 chain is a member selected from the group consisting of C₁-C₄ alkyl, hydroxy-(C₁-C₂ alkyl),
3 carboxy-(C₁-C₂ alkyl), amino-(C₃-C₅ alkyl), guanidino-(C₂-C₄ alkyl), carbamoyl-(C₁-C₂
4 alkyl), mercapto-(C₁-C₂ alkyl), methylthio-(C₁-C₃ alkyl), indolylmethyl, phenyl-(C₁-C₂
5 alkyl), and hydroxyphenyl-(C₁-C₂ alkyl).

1 **12.** The peptide analog of claims **1** or **2** in which R¹ is CH₂, R² is N, and
2 said amino acid side chain is a member selected from the group consisting of C₁-C₄ alkyl,
3 hydroxy-(C₁-C₂ alkyl), carboxy-(C₁-C₂ alkyl), amino-(C₃-C₅ alkyl), guanidino-(C₂-C₄ alkyl),
4 carbamoyl-(C₁-C₂ alkyl), mercapto-(C₁-C₂ alkyl), methylthio-(C₁-C₃ alkyl), indolylmethyl,
5 phenyl-(C₁-C₂ alkyl), and hydroxyphenyl-(C₁-C₂ alkyl).

1 **13.** The peptide analog of claims **1** or **2** in which the amino acids of said
2 peptide analog are from 2 to 200 in number and said azacyclohexenone groups are from 1 to
3 100 in number.

1 **14.** The peptide analog of claims **1** or **2** in which the amino acids of said
2 peptide analog are from 2 to 200 in number, said azacyclohexenone groups are from 1 to 100
3 in number, and the number ratio of said azacyclohexenone groups to amino acids is from 1:10
4 to 10:1.

1 **15.** The peptide analog of claims **1** or **2** in which the amino acids of said
2 peptide analog are from 2 to 100 in number and said azacyclohexenone groups are from 1 to
3 50 in number.

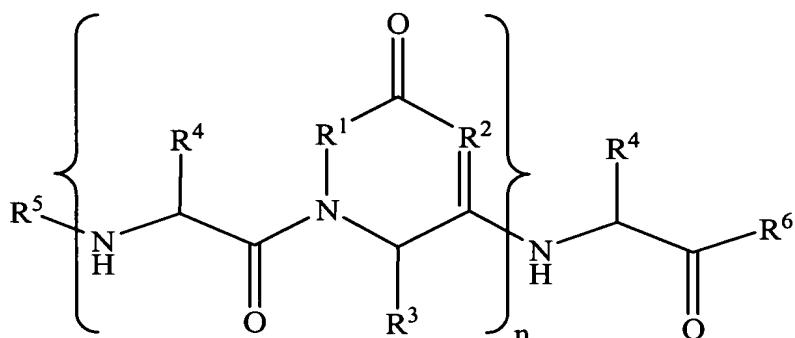
1 **16.** The peptide analog of claims **1** or **2** in which the amino acids of said
2 peptide analog are from 2 to 100 in number, said azacyclohexenone groups are from 1 to 50
3 in number, and the number ratio of said azacyclohexenone groups to amino acids is from 1:10
4 to 10:1.

1 **17.** The peptide analog of claims 1 or 2 in which all remaining amino acids
2 in said peptide analog are a combination of natural and unnatural amino acids.

1 **18.** The peptide analog of claims 1 or 2 in which all remaining amino acids
2 in said peptide analog are natural amino acids.

1 **19.** The peptide analog of claims 1 or 2 in which R¹ is CH₂, R² is N, and
2 R³ is a member selected from the group consisting of C₁-C₄ alkyl, hydroxy-(C₁-C₂ alkyl),
3 carboxy-(C₁-C₂ alkyl), amino-(C₃-C₅ alkyl), guanidino-(C₂-C₄ alkyl), carbamoyl-(C₁-C₂
4 alkyl), mercapto-(C₁-C₂ alkyl), methylthio-(C₁-C₃ alkyl), indolylmethyl, phenyl-(C₁-C₂
5 alkyl), and hydroxyphenyl-(C₁-C₂ alkyl), and all remaining amino acids in said peptide
6 analog are natural amino acids.

1 **20.** A peptide analog having the formula



2 in which:

4 R¹ is CH₂ or NH,

5 R² is CH or N,

6 R³ is H or an amino acid side chain,

7 such that in at least one such azacyclohexenone group:

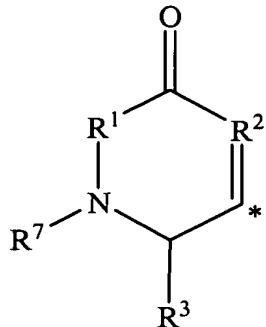
8 when R¹ is CH₂ and R² is CH, R³ is an amino acid side chain, and

9 when either R¹ is NH, or R² is N, or R¹ is NH and R² is N, R³ is H or an amino
10 acid side chain,

11 and when said peptide analog contains two or more azacyclohexenone groups of said
12 formula, R¹, R², and R³ of any one azacyclohexenone group in said peptide analog are either
13 the same as or different from R¹, R², and R³ of any other azacyclohexenone group in said
14 peptide analog,

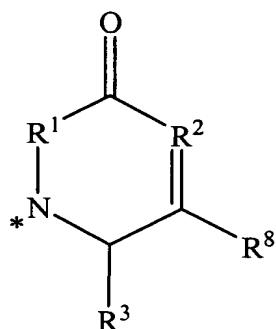
15 the R⁴'s are the same or different and each R⁴ is either H or an amino acid side
16 chain,

17 R⁵ is a member selected from the group consisting of peptide chain
18 terminating groups and



19
20 in which R⁷ is a member selected from the group consisting of H,
21 alkyl, acyl, carbamoyl, and alkoxy carbamoyl, and * denotes the site of
22 attachment,

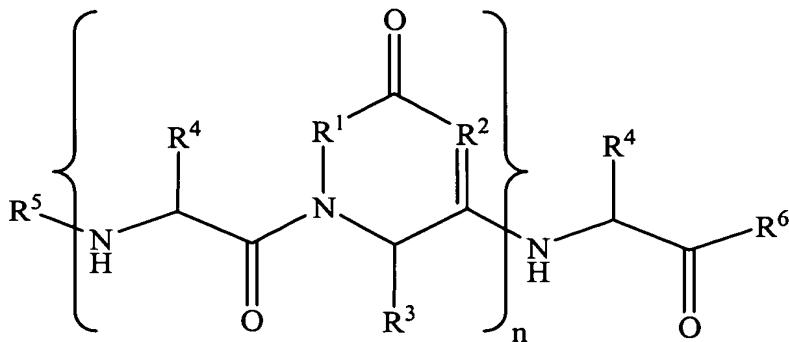
23 R⁶ is a member selected from the group consisting of peptide chain
24 terminating groups and



25
26 in which R⁸ is a member selected from the group consisting of
27 hydroxyl, alkoxy, alkylamino, dialkylamino, and arylamino, and *
28 denotes the site of attachment, and

29 n is at least 2.

1 21. A peptide analog having the formula



3 in which:

4 R^1 is CH_2 or NH ,

5 R^2 is CH or N ,

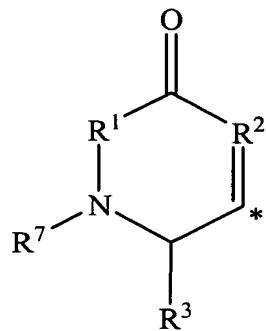
6 when R^1 is CH_2 and R^2 is CH , R^3 is an amino acid side chain, and

7 when either R^1 is NH , or R^2 is N , or R^1 is NH and R^2 is N , R^3 is H or an amino
8 acid side chain,

9 and when said peptide analog contains two or more azacyclohexenone groups of said
10 formula, R^1 , R^2 , and R^3 of any one azacyclohexenone group in said peptide analog are either
11 the same as or different from R^1 , R^2 , and R^3 of any other azacyclohexenone group in said
12 peptide analog,

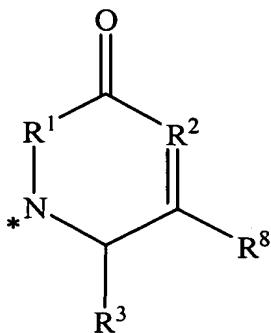
13 the R^4 's are the same or different and each R^4 is either H or an amino acid side
14 chain,

15 R^5 is a member selected from the group consisting of peptide chain
16 terminating groups and



17 in which R^7 is a member selected from the group consisting of H ,
18 alkyl, acyl, carbamoyl, and alkoxy carbamoyl, and * denotes the site of
19 attachment,

20 R^6 is a member selected from the group consisting of peptide chain
21 terminating groups and



23
24 in which R⁸ is a member selected from the group consisting of
25 hydroxyl, alkoxy, alkylamino, dialkylamino, and arylamino, and *
26 denotes the site of attachment, and
27 n is at least 2.

- 1 **22.** The peptide analog of claim **21** in which R¹ is CH₂ and R² is N.
- 1 **23.** The peptide analog of claim **21** in which R¹ is NH and R² is CH.
- 1 **24.** The peptide analog of claim **21** in which R¹ is NH and R² is N.
- 1 **25.** The peptide analog of claim **21** in which R¹ is CH₂ and R² is CH.
- 1 **26.** The peptide analog of claim **21** in which said peptide analog is an
2 L-stereoisomer relative to R³ when R³ is an amino acid side chain
- 1 **27.** The peptide analog of claim **21** in which all R³'s are side chains of
2 natural amino acids.
- 1 **28.** The peptide analog of claim **21** in which at least one R³ is a side chain
2 of a natural amino acid.
- 1 **29.** The peptide analog of claim **21** in which each R⁴ is either H or a side
2 chain of a natural amino acid.
- 1 **30.** The peptide analog of claim **21** in which at least one R⁴ is either H or a
2 side chain of a natural amino acid.
- 1 **31.** The peptide analog of claim **21** in which all R³'s and all R⁴'s are
2 members selected from the group consisting of H, C₁-C₆ alkyl, C₁-C₆ alkyl interrupted by
3 -O-, C₁-C₆ alkyl interrupted by -S-, hydroxy-(C₁-C₆ alkyl), carboxy-(C₁-C₆ alkyl), amino-

4 (C₁-C₆ alkyl), guanidino-(C₁-C₆ alkyl), carbamoyl-(C₁-C₆ alkyl), mercapto-(C₁-C₆ alkyl),
5 indolyl-(C₁-C₃ alkyl), phenyl-(C₁-C₃ alkyl), hydroxyphenyl-(C₁-C₆ alkyl), halophenyl-(C₁-C₆
6 alkyl), imidazolyl-(C₁-C₆ alkyl), phenyl, and sulfoximino-(C₁-C₆ alkyl).

1 **32.** The peptide analog of claim **21** in which all R³'s and all R⁴'s are
2 members selected from the group consisting of H, C₁-C₄ alkyl, hydroxy -(C₁-C₂ alkyl),
3 carboxy-(C₁-C₂ alkyl), amino-(C₃-C₅ alkyl), guanidino -(C₂-C₄ alkyl), carbamoyl-(C₁-C₂
4 alkyl), mercapto-(C₁-C₂ alkyl), methylthio-(C₁-C₃ alkyl), indolylmethyl, phenyl-(C₁-C₂
5 alkyl), and hydroxyphenyl-(C₁-C₂ alkyl).

1 **33.** The peptide analog of claim **21** in which R¹ is CH₂, R² is N, and all
2 R³'s and all R⁴'s are members selected from the group consisting of H, C₁-C₄ alkyl, hydroxy -
3 (C₁-C₂ alkyl), carboxy-(C₁-C₂ alkyl), amino-(C₃-C₅ alkyl), guanidino -(C₂-C₄ alkyl),
4 carbamoyl-(C₁-C₂ alkyl), mercapto-(C₁-C₂ alkyl), methylthio-(C₁-C₃ alkyl), indolylmethyl,
5 phenyl-(C₁-C₂ alkyl), and hydroxyphenyl-(C₁-C₂ alkyl).

1 **34.** The peptide analog of claim **21** in which the R⁴'s are a combination
2 comprising side chains of natural and unnatural amino acids.

1 **35.** The peptide analog of claim **21** in which each R⁴ is either H or a side
2 chain of a natural amino acid.

1 **36.** The peptide analog of claim **21** in which all remaining amino acids in
2 said peptide analog are a combination comprising natural and unnatural amino acids.

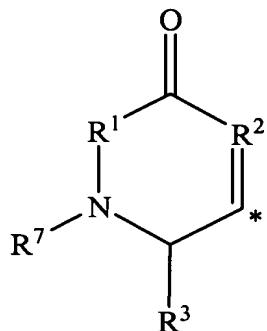
1 **37.** The peptide analog of claim **21** in which all remaining amino acids in
2 said peptide analog are natural amino acids.

3 **38.** The peptide analog of claim **21** in which R⁵ is a member selected from
4 the group consisting of H, alkyl, acyl, carbamoyl, and alkoxycarbonyl.

1 **39.** The peptide analog of claim **21** in which R⁵ is acetyl.

1 **40.** The peptide analog of claim **21** in which R⁵ is

2

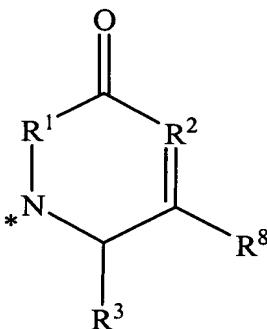


1 **41.** The peptide analog of claim **21** in which R⁶ is a member selected from
2 the group consisting of hydroxyl, alkoxy, alkylamino, dialkylamino, and arylamino.

1 **42.** The peptide analog of claim **21** in which R⁶ is a member selected from
2 the group consisting of hydroxyl and methylamino.

1 **43.** The peptide analog of claim **21** in which R⁶ is

2



1 **44.** The peptide analog of claim **21** in which n is 2 to 100.

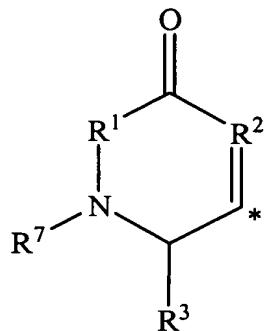
1 **45.** The peptide analog of claim **21** in which n is 2 to 50.

1 **46.** The peptide analog of claim **21** in which n is 2 to 5.

1 **47.** The peptide analog of claim **33** in which R⁵ is a member selected from
2 the group consisting of H, alkyl, acyl, carbamoyl, and alkoxy carbonyl, and R⁶ is a member
3 selected from the group consisting of hydroxyl, alkoxy, alkylamino, dialkylamino, and
4 arylarnino.

1 **48.** The peptide analog of claim **33** in which R⁵ is

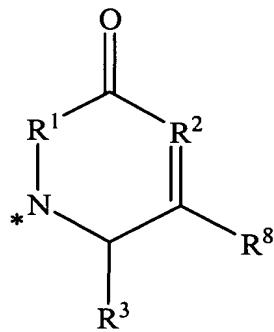
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1

49. The peptide analog of claim 33 in which R⁶ is

2



1 50. A peptide analog comprising a first segment consisting of a first
2 sequence of amino acids joined by amide bonds and a second segment consisting of a second
3 sequence of amino acids joined by amide bonds, in which at least one amino acid, but less
4 than all amino acids, of said second segment is replaced by an azacyclohexenone group
5 having the formula

6

7 in which:

8 R¹ is CH₂ or NH,

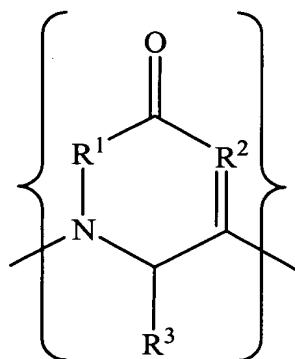
9 R² is CH or N, and

10 R³ is H or an amino acid side chain,

11 such that in at least one such azacyclohexenone group:

12 when R¹ is CH₂ and R² is CH, R³ is an amino acid side chain, and
13 when either R¹ is NH, or R² is N, or R¹ is NH and R² is N, R³ is H or an amino
14 acid side chain,
15 and when said peptide analog contains two or more azacyclohexenone groups of said
16 formula, R¹, R², and R³ of any one azacyclohexenone group in said peptide analog are either
17 the same as or different from R¹, R², and R³ of any other azacyclohexenone group in said
18 peptide analog,
19 said first and second segments joined by a covalent linkage that permits said first and second
20 segments to enter into a β -sheet-like interaction with each other or with a third sequence of
21 amino acids joined by amide bonds.

1 **51.** A peptide analog comprising a first segment consisting of a first
2 sequence of amino acids joined by amide bonds and a second segment consisting of a second
3 sequence of amino acids joined by amide bonds, in which at least one amino acid, but less
4 than all amino acids, of said second segment is replaced by an azacyclohexenone group
5 having the formula



6 in which:
7
8 R¹ is CH₂ or NH,
9 R² is CH or N, and
10 when R¹ is CH₂ and R² is CH, R³ is an amino acid side chain, and
11 when either R¹ is NH, or R² is N, or R¹ is NH and R² is N, R³ is H or an amino
12 acid side chain,
13 and when said peptide analog contains two or more azacyclohexenone groups of said
14 formula, R¹, R², and R³ of any one azacyclohexenone group in said peptide analog are either
15 the same as or different from R¹, R², and R³ of any other azacyclohexenone group in said
16 peptide analog,

17 said first and second segments joined by a covalent linkage that permits said first and second
18 segments to enter into a β -sheet-like interaction with each other or with a third sequence of
19 amino acids joined by amide bonds.

1 **52.** The peptide analog of claim **50** in which R¹ is CH₂ and R² is N.

1 **53.** The peptide analog of claim **50** in which R¹ is NH and R² is CH.

1 **54.** The peptide analog of claim **50** in which R¹ is NH and R² is N.

1 **55.** The peptide analog of claim **50** in which R¹ is CH₂ and R² is CH.

1 **56.** The peptide analog of claim **50** in which said peptide analog is an
2 L-stereoisomer relative to R³ when R³ is an amino acid side chain

1 **57.** The peptide analog of claim **50** in which all R³'s are side chains of
2 natural amino acids.

1 **58.** The peptide analog of claim **50** in which at least one R³ is a side chain
2 of a natural amino acid.

1 **59.** The peptide analog of claim **50** in which all R³'s are members selected
2 from the group consisting of C₁-C₆ alkyl, C₁-C₆ alkyl interrupted by -O-, C₁-C₆ alkyl
3 interrupted by -S-, hydroxy -(C₁-C₆ alkyl), carboxy-(C₁-C₆ alkyl), amino-(C₁-C₆ alkyl),
4 guanidino -(C₁-C₆ alkyl), carbamoyl-(C₁-C₆ alkyl), mercapto-(C₁-C₆ alkyl), indolyl-(C₁-C₃
5 alkyl), phenyl-(C₁-C₃ alkyl), hydroxyphenyl-(C₁-C₆ alkyl), halophenyl-(C₁-C₆ alkyl),
6 imidazolyl-(C₁-C₆ alkyl), phenyl, and sulfoximino-(C₁-C₆ alkyl).

1 **60.** The peptide analog of claim **50** in which all R³'s are members selected
2 from the group consisting of C₁-C₄ alkyl, hydroxy -(C₁-C₂ alkyl), carboxy-(C₁-C₂ alkyl),
3 amino-(C₃-C₅ alkyl), guanidino -(C₂-C₄ alkyl), carbamoyl-(C₁-C₂ alkyl), mercapto-(C₁-C₂
4 alkyl), methylthio-(C₁-C₃ alkyl), indolylmethyl, phenyl-(C₁-C₂ alkyl), and hydroxyphenyl-
5 (C₁-C₂ alkyl).

1 **61.** The peptide analog of claim **50** in which R¹ is CH₂, R² is N, and all
2 R³'s are members selected from the group consisting of C₁-C₄ alkyl, hydroxy -(C₁-C₂ alkyl),
3 carboxy-(C₁-C₂ alkyl), amino-(C₃-C₅ alkyl), guanidino -(C₂-C₄ alkyl), carbamoyl-(C₁-C₂

4 alkyl), mercapto-(C₁-C₂ alkyl), methylthio-(C₁-C₃ alkyl), indolylmethyl, phenyl-(C₁-C₂
5 alkyl), and hydroxyphenyl-(C₁-C₂ alkyl).

1 **62.** The peptide analog of claim **50** in which the amino acids in said first
2 segment are a combination of natural and unnatural amino acids.

1 **63.** The peptide analog of claim **50** in which the amino acids in said first
2 segment are natural amino acids.

1 **64.** The peptide analog of claim **50** in which the remaining amino acids in
2 said second segment are a combination of natural and unnatural amino acids.

1 **65.** The peptide analog of claim **50** in which the remaining amino acids in
2 said second segment are natural amino acids.

1 **66.** The peptide analog of claim **50** in which said second segment consists
2 of an amino acid sequence in which two or more non-adjacent amino acids are replaced by
3 azacyclohexenone groups of said formula.

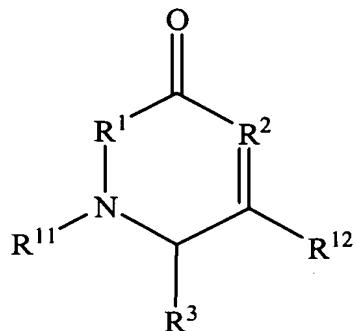
1 **67.** The peptide analog of claim **50** in which, in at least a portion of said
2 second segment, every second amino acid is replaced by azacyclohexenone groups of said
3 formula.

1 **68.** The peptide analog of claim **50** in which said first segment contains
2 from 3 to 200 amino acids and in said second segment the total number of amino acids and
3 azacyclohexenone groups is from 3 to 200.

1 **69.** The peptide analog of claim **50** in which said first segment contains
2 from 3 to 20 amino acids and in said second segment the total number of amino acids and
3 azacyclohexenone groups is from 3 to 20.

1 **70.** The peptide analog of claim **50** in which said covalent linkage is a
2 member selected from the group consisting of D-Pro-Ala and Asn-Gly.

1 **71.** A compound having the formula



2
3 in which:
4 R¹ is CH₂ or NH,
5 R² is CH or N,
6 when R¹ is CH₂ and R² is CH, R³ is an amino acid side chain,
7 when either R¹ is NH, or R² is N, or R¹ is NH and R² is N, R³ is H or an amino
8 acid side chain,
9 R¹¹ is a nitrogen protecting group, and
10 R¹² is a member selected from the group consisting of OH, SH, and activated
11 leaving groups.

- 1 **72.** The compound of claim 71 in which R¹ is CH₂ and R² is N.
 1 **73.** The compound of claim 71 in which R¹ is NH and R² is CH.
 1 **74.** The compound of claim 71 in which R¹ is NH and R² is N.
 1 **75.** The compound of claim 71 in which R¹ is CH₂ and R² is CH.
 1 **76.** The compound of claim 71 in which said compound is an
 2 L-stereoisomer relative to R³ when R³ is an amino acid side chain
 1 **77.** The compound of claim 71 in which R³ is a side chain of a natural
 2 amino acid.
 1 **78.** The compound of claim 71 in which R³ is a member selected from the
 2 group consisting of C₁-C₆ alkyl, C₁-C₆ alkyl interrupted by -O-, C₁-C₆ alkyl interrupted by
 3 -S-, hydroxy-(C₁-C₆ alkyl), carboxy-(C₁-C₆ alkyl), amino-(C₁-C₆ alkyl), guanidino-(C₁-C₆
 4 alkyl), carbamoyl-(C₁-C₆ alkyl), mercapto-(C₁-C₆ alkyl), (C₁-C₃ alkyl)thio-(C₁-C₃ alkyl),
 5 indolyl-(C₁-C₃ alkyl), phenyl-(C₁-C₃ alkyl), hydroxyphenyl-(C₁-C₆ alkyl), halophenyl-(C₁-C₆
 6 alkyl), imidazolyl-(C₁-C₆ alkyl), phenyl, and sulfoximino-(C₁-C₆ alkyl).

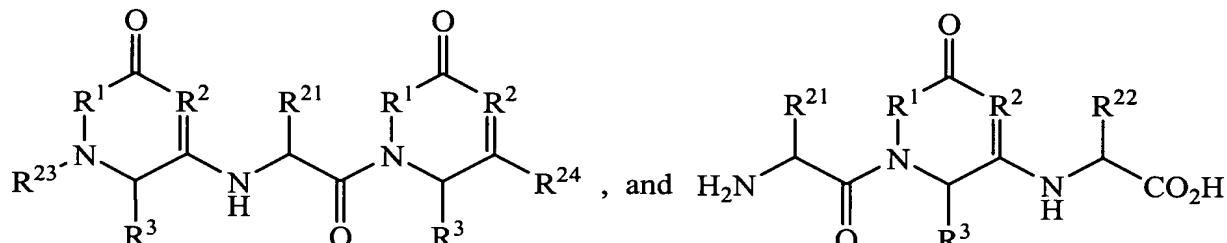
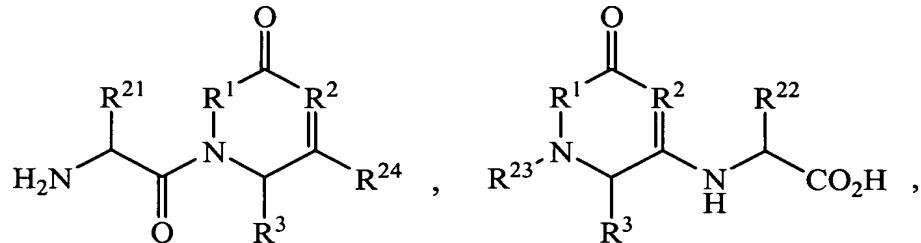
1 **79.** The compound of claim **71** in which R³ is a member selected from the
2 group consisting of C₁-C₄ alkyl, hydroxy-(C₁-C₂ alkyl), carboxy-(C₁-C₂ alkyl), amino-(C₃-C₅
3 alkyl), guanidino-(C₂-C₄ alkyl), carbamoyl-(C₁-C₂ alkyl), mercapto-(C₁-C₂ alkyl),
4 methylthio-(C₁-C₃ alkyl), indolylmethyl, phenyl-(C₁-C₂ alkyl), and hydroxyphenyl-(C₁-C₂
5 alkyl).

1 **80.** The compound of claim **71** in which R¹ is CH₂, R² is N, and R³ is a
2 member selected from the group consisting of C₁-C₄ alkyl, hydroxy-(C₁-C₂ alkyl), carboxy-
3 (C₁-C₂ alkyl), amino-(C₃-C₅ alkyl), guanidino-(C₂-C₄ alkyl), carbamoyl-(C₁-C₂ alkyl),
4 mercapto-(C₁-C₂ alkyl), methylthio-(C₁-C₃ alkyl), indolylmethyl, phenyl-(C₁-C₂ alkyl), and
5 hydroxyphenyl-(C₁-C₂ alkyl).

1 **81.** The compound of claim **80** in which R¹² is OH.

1 **82.** The compound of claim **80** in which R¹² is an activated leaving group.

1 **83.** A compound having a formula selected from the group consisting of



2 in which:

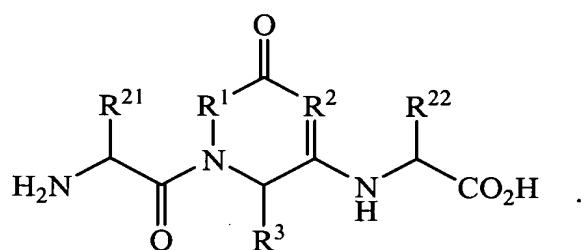
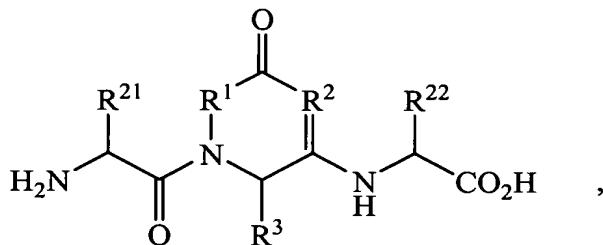
4 R¹ is CH₂ or NH,

5 R² is CH or N,

6 when R¹ is CH₂ and R² is CH, R³ is an amino acid side chain,

7 when either R¹ is NH, or R² is N, or R¹ is NH and R² is N, R³ is H or an amino
8 acid side chain, and

9 when R¹, R², and R³ occur twice in said formula, each R¹ is either the same or
10 different, each R² is either the same or different, and each R³ is either
11 the same or different,
12 R²¹ is H or an amino acid side chain;
13 R²² is H or an amino acid side chain;
14 R²³ is a member selected from the group consisting of H and amine protecting
15 groups; and
16 R²⁴ is a member selected from the group consisting of an activated leaving
17 group, OR²⁵ where R²⁵ is H or an oxygen-protecting group, SR²⁶ where
18 R²⁶ is H or an alkyl or aryl group, and N(R²⁷)₂, where the R²⁷'s are
19 members independently selected from the group consisting of H, alkyl,
20 and aryl;
21 and amine-protected analogs of those of said group that terminate in H₂N-, carboxy-protected
22 analog of those of said group that terminate in -CO₂H, carboxy-activated analogs of those of
23 said group that terminate in -CO₂H, amine-protected and carboxy-protected analogs of



- 1 84. The compound of claim 83 in which R¹ is CH₂ and R² is N.
1 85. The compound of claim 83 in which R¹ is NH and R² is CH.
1 86. The compound of claim 83 in which R¹ is NH and R² is N.
1 87. The compound of claim 83 in which R¹ is CH₂ and R² is CH.

1 **88.** The compound of claim **83** in which said compound is an
2 L-stereoisomer relative to R³ when R³ is an amino acid side chain.

1 **89.** The compound of claim **83** in which R³ is a side chain of a natural
2 amino acid of a natural amino acid.

1 **90.** The compound of claim **83** in which R³ is a side chain of an unnatural
2 amino acid of a natural amino acid.

1 **91.** The compound of claim **83** in which R³ is a side chain of a natural
2 amino acid and R²¹ and R²² are independently H or side chains of natural amino acids.

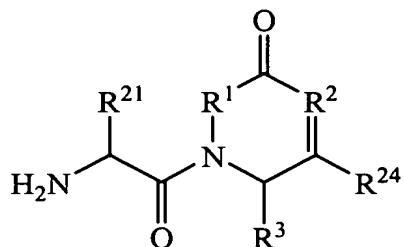
1 **92.** The compound of claim **83** in which at least one of R³, R²¹, and R²² is a
2 side chain of a natural amino acid.

1 **93.** The compound of claim **83** in which R³, R²¹, and R²² are members
2 selected from the group consisting of H, C₁-C₆ alkyl, C₁-C₆ alkyl interrupted by -O-, C₁-C₆
3 alkyl interrupted by -S-, hydroxy-(C₁-C₆ alkyl), carboxy-(C₁-C₆ alkyl), amino-(C₁-C₆ alkyl),
4 guanidino-(C₁-C₆ alkyl), carbamoyl-(C₁-C₆ alkyl), mercapto-(C₁-C₆ alkyl), indolyl-(C₁-C₃
5 alkyl), phenyl-(C₁-C₃ alkyl), hydroxyphenyl-(C₁-C₆ alkyl), halophenyl-(C₁-C₆ alkyl),
6 imidazolyl-(C₁-C₆ alkyl), phenyl, and sulfoximino-(C₁-C₆ alkyl).

1 **94.** The compound of claim **83** in which R³, R²¹, and R²² are members
2 selected from the group consisting of H, C₁-C₄ alkyl, hydroxy-(C₁-C₂ alkyl), carboxy-(C₁-C₂
3 alkyl), amino-(C₃-C₅ alkyl), guanidino-(C₂-C₄ alkyl), carbamoyl-(C₁-C₂ alkyl), mercapto-
4 (C₁-C₂ alkyl), methylthio-(C₁-C₃ alkyl), indolylmethyl, phenyl-(C₁-C₂ alkyl), and
5 hydroxyphenyl-(C₁-C₂ alkyl).

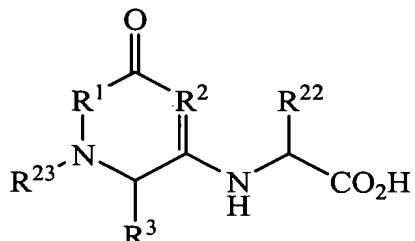
1 **95.** The compound of claim **83** in which R¹ is CH₂, R² is N, and R³, R²¹,
2 and R²² are members selected from the group consisting of H, C₁-C₄ alkyl, hydroxy-(C₁-C₂
3 alkyl), carboxy-(C₁-C₂ alkyl), amino-(C₃-C₅ alkyl), guanidino-(C₂-C₄ alkyl), carbamoyl-
4 (C₁-C₂ alkyl), mercapto-(C₁-C₂ alkyl), methylthio-(C₁-C₃ alkyl), indolylmethyl, phenyl-
5 (C₁-C₂ alkyl), and hydroxyphenyl-(C₁-C₂ alkyl).

1 **96.** The compound of claim **83** which is a member selected from the group
2 consisting of compounds of the formula



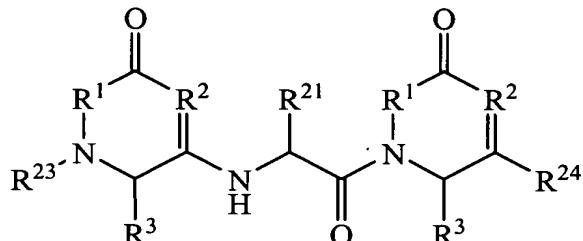
3
 4 in which R²⁴ is a member selected from the group consisting of an activated leaving group,
 5 OR²⁵ where R²⁵ is H or an oxygen-protecting group, SR²⁶ where R²⁶ is H or an alkyl or aryl
 6 group, or NR²⁷₂ where the R²⁷'s are members independently selected from the group
 7 consisting of H, alkyl, or aryl; and amine-protected analogs of said compounds.

1 **97.** The compound of claim **83** which is a member selected from the group
 2 consisting of compounds of the formula



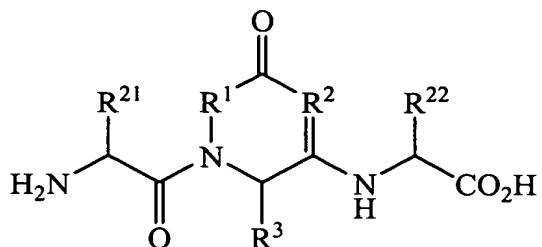
3
 4 in which R²³ is an amine protecting group, and carboxy-protected analogs of said compounds.

1 **98.** The compound of claim **83** which is a member selected from the group
 2 consisting of compounds of the formula



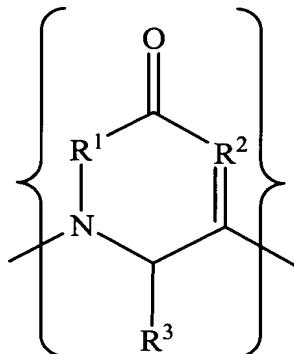
3
 4 in which R²³ is an amine protecting group and R²⁴ is a member selected from the group
 5 consisting of an activated leaving group, OR²⁵ where R²⁵ is H or an oxygen-protecting group,
 6 SR²⁶ where R²⁶ is H or an alkyl or aryl group, or NR²⁷₂ where each R²⁷ is a member
 7 independently selected from the group consisting of H, alkyl, or aryl; and amine-protected
 8 analogs of said compounds.

1 **99.** The compound of claim **83** which is a member selected from the group
 2 consisting of compounds of the formula



3
 4 amine-protected analogs of said compounds, carboxy-protected analogs of said compounds,
 5 amine-protected and carboxy-protected analogs of said compounds, and amine-protected and
 6 carboxy-activated analogs of said compounds.

1 **100.** A method for inhibiting the association of a selected peptide with other
 2 peptides, said method comprising contacting said selected peptide with a peptide analog
 3 defined as a peptide in which at least one amino acid, but less than all amino acids is replaced
 4 by an azacyclohexenone group having the formula



5
 6 in which:

7 R¹ is CH₂ or NH,

8 R² is CH or N, and

9 R³ is H or an amino acid side chain,

10 such that in at least one such azacyclohexenone group:

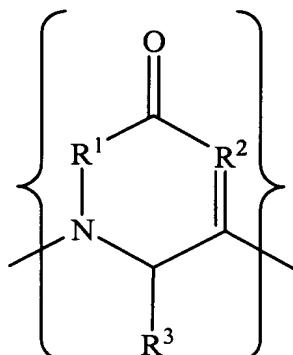
11 when R¹ is CH₂ and R² is CH, R³ is an amino acid side chain, and

12 when either R¹ is NH, or R² is N, or R¹ is NH and R² is N, R³ is H or an amino
 13 acid side chain,

14 and when said peptide analog contains two or more azacyclohexenone groups of said
 15 formula, R¹, R², and R³ of any one azacyclohexenone group in said peptide analog are either
 16 the same as or different from R¹, R², and R³ of any other azacyclohexenone group in said
 17 peptide analog,

18 to achieve a β-sheet like interaction between said selected peptide and said peptide analog.

1 **101.** A method for inhibiting the association of a selected peptide with other
2 peptides, said method comprising contacting said selected peptide with a peptide analog
3 defined as a peptide in which at least one amino acid, but less than all amino acids is replaced
4 by an azacyclohexenone group having the formula



6 in which:

7 R¹ is CH₂ or NH,

8 R² is CH or N, and

9 when R¹ is CH₂ and R² is CH, R³ is an amino acid side chain, and

10 when either R¹ is NH, or R² is N, or R¹ is NH and R² is N, R³ is H or an amino
11 acid side chain,

12 and when said peptide analog contains two or more azacyclohexenone groups of said
13 formula, R¹, R², and R³ of any one azacyclohexenone group in said peptide analog are either
14 the same as or different from R¹, R², and R³ of any other azacyclohexenone group in said
15 peptide analog,

16 to achieve a β -sheet like interaction between said selected peptide and said peptide analog.

1 **102.** The method of claim 101 in which R¹ is CH₂ and R² is N.

1 **103.** The method of claim 101 in which R¹ is NH and R² is CH.

1 **104.** The method of claim 101 in which R¹ is NH and R² is N.

1 **105.** The method of claim 101 in which R¹ is CH₂ and R² is CH.

1 **106.** The method of claim 101 in which said azacyclohexenone group is an
2 L-stereoisomer relative to R³ when R³ is an amino acid side chain.

1 **107.** The method of claim **101** in which R³ is a member selected from the
2 group consisting of C₁-C₆ alkyl, C₁-C₆ alkyl interrupted by -O-, C₁-C₆ alkyl interrupted by
3 -S-, hydroxy-(C₁-C₆ alkyl), carboxy-(C₁-C₆ alkyl), amino-(C₁-C₆ alkyl), guanidino-(C₁-C₆
4 alkyl), carbamoyl-(C₁-C₆ alkyl), mercapto-(C₁-C₆ alkyl), indolyl-(C₁-C₃ alkyl), phenyl-(C₁-C₃
5 alkyl), hydroxyphenyl-(C₁-C₆ alkyl), halophenyl-(C₁-C₆ alkyl), imidazolyl-(C₁-C₆ alkyl),
6 phenyl, and sulfoximino-(C₁-C₆ alkyl).

1 **108.** The method of claim **101** in which R³ is a member selected from the
2 group consisting of C₁-C₄ alkyl, hydroxy-(C₁-C₂ alkyl), carboxy-(C₁-C₂ alkyl), amino-(C₃-C₅
3 alkyl), guanidino-(C₂-C₄ alkyl), carbamoyl-(C₁-C₂ alkyl), mercapto-(C₁-C₂ alkyl),
4 methylthio-(C₁-C₃ alkyl), indolylmethyl, phenyl-(C₁-C₂ alkyl), and hydroxyphenyl-(C₁-C₂
5 alkyl).

1 **109.** The method of claim **101** in which R¹ is CH₂, R² is N, and R³ is a
2 member selected from the group consisting of C₁-C₄ alkyl, hydroxy-(C₁-C₂ alkyl), carboxy-
3 (C₁-C₂ alkyl), amino-(C₃-C₅ alkyl), guanidino-(C₂-C₄ alkyl), carbamoyl-(C₁-C₂ alkyl),
4 mercapto-(C₁-C₂ alkyl), methylthio-(C₁-C₃ alkyl), indolylmethyl, phenyl-(C₁-C₂ alkyl), and
5 hydroxyphenyl-(C₁-C₂ alkyl).

1 **110.** The method of claim **101** in which said peptide analog is a peptide in
2 which two or more non-adjacent amino acids are replaced by azacyclohexenone groups of
3 said formula.

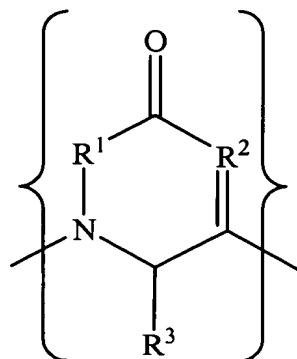
1 **111.** The method of claim **101** in which said peptide analog is a peptide in
2 which, in at least a portion thereof, every second amino acid is replaced by an
3 azacyclohexenone group of said formula, and the number of said azacyclohexenone groups in
4 said peptide analog is two or more.

1 **112.** The method of claim **101** in which the total number of amino acids and
2 azacyclohexenone groups in said peptide analog is from 3 to 200.

1 **113.** The method of claim **101** in which the total number of amino acids and
2 azacyclohexenone groups in said peptide analog is from 4 to 20.

1 **114.** A method for inhibiting the association of a peptide with a double
2 stranded nucleic acid, said method comprising contacting said peptide with a peptide analog

3 defined as a peptide in which at least one amino acid, but less than all amino acids, is
4 replaced by an azacyclohexenone group having the formula



5
6 in which:

7 R¹ is CH₂ or NH,

8 R² is CH or N, and

9 R³ is H or an amino acid side chain,

10 such that in at least one such azacyclohexenone group:

11 when R¹ is CH₂ and R² is CH, R³ is an amino acid side chain, and

12 when either R¹ is NH, or R² is N, or R¹ is NH and R² is N, R³ is H or an amino
13 acid side chain,

14 and when said peptide analog contains two or more azacyclohexenone groups of said
15 formula, R¹, R², and R³ of any one azacyclohexenone group in said peptide analog are either
16 the same as or different from R¹, R², and R³ of any other azacyclohexenone group in said
17 peptide analog,
18 to achieve a β -sheet-like interaction between said peptide and said peptide analog.

1 **115.** A method for inhibiting the association of a peptide with a double
2 stranded nucleic acid, said method comprising contacting said peptide with a peptide analog
3 defined as a peptide in which at least one amino acid, but less than all amino acids, is
4 replaced by an azacyclohexenone group having the formula

5

6 in which:

7 R¹ is CH₂ or NH,

8 R² is CH or N, and

9 when R¹ is CH₂ and R² is CH, R³ is an amino acid side chain, and

10 when either R¹ is NH, or R² is N, or R¹ is NH and R² is N, R³ is H or an amino
11 acid side chain,

12 and when said peptide analog contains two or more azacyclohexenone groups of said
13 formula, R¹, R², and R³ of any one azacyclohexenone group in said peptide analog are either
14 the same as or different from R¹, R², and R³ of any other azacyclohexenone group in said
15 peptide analog,

16 to achieve a β -sheet-like interaction between said peptide and said peptide analog.

1 **116.** The method of claim 115 in which R¹ is CH₂ and R² is N.

1 **117.** The method of claim 115 in which R¹ is NH and R² is CH.

1 **118.** The method of claim 115 in which R¹ is NH and R² is N.

1 **119.** The method of claim 115 in which R¹ is CH₂ and R² is CH.

1 **120.** The method of claim 115 in which said azacyclohexenone group is an
2 L-stereoisomer relative to R³ when R³ is an amino acid side chain.

1 **121.** The method of claim 115 in which R³ is a member selected from the
2 group consisting of C₁-C₆ alkyl, C₁-C₆ alkyl interrupted by -O-, C₁-C₆ alkyl interrupted by
3 -S-, hydroxy-(C₁-C₆ alkyl), carboxy-(C₁-C₆ alkyl), amino-(C₁-C₆ alkyl), guanidino-(C₁-C₆
4 alkyl), carbamoyl-(C₁-C₆ alkyl), mercapto-(C₁-C₆ alkyl), indolyl-(C₁-C₃ alkyl), phenyl-(C₁-C₃
5 alkyl), hydroxyphenyl-(C₁-C₆ alkyl), halophenyl-(C₁-C₆ alkyl), imidazolyl-(C₁-C₆ alkyl),
6 phenyl, and sulfoximino-(C₁-C₆ alkyl).

1 **122.** The method of claim **115** in which R³ is a member selected from the
2 group consisting of C₁-C₄ alkyl, hydroxy -(C₁-C₂ alkyl), carboxy-(C₁-C₂ alkyl), amino-(C₃-C₅
3 alkyl), guanidino -(C₂-C₄ alkyl), carbamoyl-(C₁-C₂ alkyl), mercapto-(C₁-C₂ alkyl),
4 methylthio-(C₁-C₃ alkyl), indolylmethyl, phenyl-(C₁-C₂ alkyl), and hydroxyphenyl-(C₁-C₂
5 alkyl).

1 **123.** The method of claim **115** in which R¹ is CH₂, R² is N, and R³ is a
2 member selected from the group consisting of C₁-C₄ alkyl, hydroxy -(C₁-C₂ alkyl), carboxy-
3 (C₁-C₂ alkyl), amino-(C₃-C₅ alkyl), guanidino -(C₂-C₄ alkyl), carbamoyl-(C₁-C₂ alkyl),
4 mercapto-(C₁-C₂ alkyl), methylthio-(C₁-C₃ alkyl), indolylmethyl, phenyl-(C₁-C₂ alkyl), and
5 hydroxyphenyl-(C₁-C₂ alkyl).

1 **124.** The method of claim **115** in which said peptide analog is a peptide in
2 which two or more non-adjacent amino acids are replaced by azacyclohexenone groups of
3 said formula.

1 **125.** The method of claim **115** in which said peptide analog is a peptide in
2 which, in at least a portion thereof, every second amino acid is replaced by an
3 azacyclohexenone group of said formula, and the number of said azacyclohexenone groups in
4 said peptide analog is two or more.

1 **126.** The method of claim **115** in which the total number of amino acids and
2 azacyclohexenone groups in said peptide analog is from 3 to 200.

1 **127.** The method of claim **115** in which the total number of amino acids and
2 azacyclohexenone groups in said peptide analog is from 4 to 20.

1 **128.** A method for inhibiting the biological activity of a peptide, said
2 method comprising contacting said peptide with a peptide analog defined as a peptide in
3 which at least one amino acid, but less than all amino acids, is replaced by an
4 azacyclohexenone group having the formula

5

6 in which:

7 R¹ is CH₂ or NH,

8 R² is CH or N, and

9 R³ is H or an amino acid side chain,

10 such that in at least one such azacyclohexenone group:

11 when R¹ is CH₂ and R² is CH, R³ is an amino acid side chain, and

12 when either R¹ is NH, or R² is N, or R¹ is NH and R² is N, R³ is H or an amino
13 acid side chain,

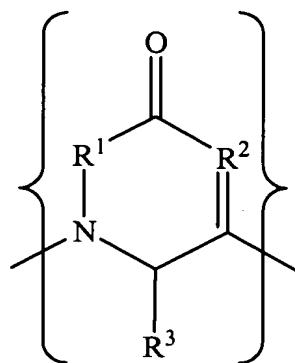
14 and when said peptide analog contains two or more azacyclohexenone groups of said
15 formula, R¹, R², and R³ of any one azacyclohexenone group in said peptide analog are either
16 the same as or different from R¹, R², and R³ of any other azacyclohexenone group in said
17 peptide analog,

18 to achieve a β-sheet-like interaction between said peptide and said peptide analog.

1 **129.** A method for inhibiting the biological activity of a peptide, said
2 method comprising contacting said peptide with a peptide analog defined as a peptide in
3 which at least one amino acid, but less than all amino acids, is replaced by an
4 azacyclohexenone group having the formula

5

6 in which:



7 R¹ is CH₂ or NH,
8 R² is CH or N, and
9 when R¹ is CH₂ and R² is CH, R³ is an amino acid side chain, and
10 when either R¹ is NH, or R² is N, or R¹ is NH and R² is N, R³ is H or an amino
11 acid side chain,
12 and when said peptide analog contains two or more azacyclohexenone groups of said
13 formula, R¹, R², and R³ of any one azacyclohexenone group in said peptide analog are either
14 the same as or different from R¹, R², and R³ of any other azacyclohexenone group in said
15 peptide analog,
16 to achieve a β-sheet-like interaction between said peptide and said peptide analog.

1 **130.** The method of claim 129 in which R¹ is CH₂ and R² is N.

1 **131.** The method of claim 129 in which R¹ is NH and R² is CH.

1 **132.** The method of claim 129 in which R¹ is NH and R² is N.

1 **133.** The method of claim 129 in which R¹ is CH₂ and R² is CH.

1 **134.** The method of claim 129 in which said azacyclohexenone group is an
2 L-stereoisomer relative to R³ when R³ is an amino acid side chain.

1 **135.** The method of claim 129 in which R³ is a member selected from the
2 group consisting of C₁-C₆ alkyl, C₁-C₆ alkyl interrupted by -O-, C₁-C₆ alkyl interrupted by
3 -S-, hydroxy -(C₁-C₆ alkyl), carboxy-(C₁-C₆ alkyl), amino-(C₁-C₆ alkyl), guanidino -(C₁-C₆
4 alkyl), carbamoyl-(C₁-C₆ alkyl), mercapto-(C₁-C₆ alkyl), indolyl-(C₁-C₃ alkyl), phenyl-(C₁-C₃
5 alkyl), hydroxyphenyl-(C₁-C₆ alkyl), halophenyl-(C₁-C₆ alkyl), imidazolyl-(C₁-C₆ alkyl),
6 phenyl, and sulfoximino-(C₁-C₆ alkyl).

1 **136.** The method of claim 129 in which R³ is a member selected from the
2 group consisting of C₁-C₄ alkyl, hydroxy -(C₁-C₂ alkyl), carboxy-(C₁-C₂ alkyl), amino-(C₃-C₅
3 alkyl), guanidino -(C₂-C₄ alkyl), carbamoyl-(C₁-C₂ alkyl), mercapto-(C₁-C₂ alkyl),
4 methylthio-(C₁-C₃ alkyl), indolylmethyl, phenyl-(C₁-C₂ alkyl), and hydroxyphenyl-(C₁-C₂
5 alkyl).

1 **137.** The method of claim 129 in which R¹ is CH₂, R² is N, and R³ is a
2 member selected from the group consisting of C₁-C₄ alkyl, hydroxy -(C₁-C₂ alkyl), carboxy-

3 (C₁-C₂ alkyl), amino-(C₃-C₅ alkyl), guanidino -(C₂-C₄ alkyl), carbamoyl-(C₁-C₂ alkyl),
4 mercapto-(C₁-C₂ alkyl), methylthio-(C₁-C₃ alkyl), indolylmethyl, phenyl-(C₁-C₂ alkyl), and
5 hydroxyphenyl-(C₁-C₂ alkyl).

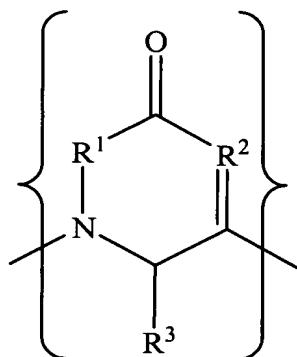
1 **138.** The method of claim 129 in which said peptide analog is a peptide in
2 which two or more non-adjacent amino acids are replaced by azacyclohexenone groups of
3 said formula.

1 **139.** The method of claim 129 in which said peptide analog is a peptide in
2 which, in at least a portion thereof, every second amino acid is replaced by an
3 azacyclohexenone group of said formula, and the number of said azacyclohexenone groups in
4 said peptide analog is two or more.

1 **140.** The method of claim 129 in which the total number of amino acids and
2 azacyclohexenone groups in said peptide analog is from 3 to 200.

1 **141.** The method of claim 129 in which the total number of amino acids and
2 azacyclohexenone groups in said peptide analog is from 4 to 20.

1 **142.** A method for increasing the tendency of a target peptide or a portion of
2 a target peptide to assume a β -strand conformation, said method comprising contacting said
3 target peptide with a peptide analog defined as a peptide in which at least one amino acid, but
4 less than all amino acids, is replaced by an azacyclohexenone group having the formula



5
6 in which:

7 R¹ is CH₂ or NH,

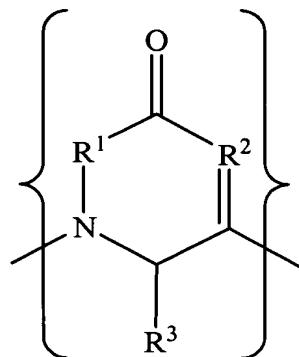
8 R² is CH or N, and

9 R³ is H or an amino acid side chain,

10 such that in at least one such azacyclohexenone group:

11 when R¹ is CH₂ and R² is CH, R³ is an amino acid side chain, and
12 when either R¹ is NH, or R² is N, or R¹ is NH and R² is N, R³ is H or an amino
13 acid side chain,
14 and when said peptide analog contains two or more azacyclohexenone groups of said
15 formula, R¹, R², and R³ of any one azacyclohexenone group in said peptide analog are either
16 the same as or different from R¹, R², and R³ of any other azacyclohexenone group in said
17 peptide analog,
18 to achieve a β -sheet-like interaction between said peptide and said peptide analog.

1 **143.** A method for increasing the tendency of a target peptide or a portion of
2 a target peptide to assume a β -strand conformation, said method comprising contacting said
3 target peptide with a peptide analog defined as a peptide in which at least one amino acid, but
4 less than all amino acids, is replaced by an azacyclohexenone group having the formula



5 in which:
6 R¹ is CH₂ or NH,
7 R² is CH or N, and
8 when R¹ is CH₂ and R² is CH, R³ is an amino acid side chain, and
9 when either R¹ is NH, or R² is N, or R¹ is NH and R² is N, R³ is H or an amino
10 acid side chain,
11 and when said peptide analog contains two or more azacyclohexenone groups of said
12 formula, R¹, R², and R³ of any one azacyclohexenone group in said peptide analog are either
13 the same as or different from R¹, R², and R³ of any other azacyclohexenone group in said
14 peptide analog,
15 to achieve a β -sheet-like interaction between said peptide and said peptide analog.

1 **144.** The method of claim 143 in which R¹ is CH₂ and R² is N.

1 **145.** The method of claim 143 in which R¹ is NH and R² is CH.

1 **146.** The method of claim 143 in which R¹ is NH and R² is N.

1 **147.** The method of claim 143 in which R¹ is CH₂ and R² is CH.

1 **148.** The method of claim 143 in which said azacyclohexenone group is an
2 L-stereoisomer relative to R³ when R³ is an amino acid side chain.

1 **149.** The method of claim 143 in which R³ is a member selected from the
2 group consisting of C₁-C₆ alkyl, C₁-C₆ alkyl interrupted by -O-, C₁-C₆ alkyl interrupted by
3 -S-, hydroxy-(C₁-C₆ alkyl), carboxy-(C₁-C₆ alkyl), amino-(C₁-C₆ alkyl), guanidino-(C₁-C₆
4 alkyl), carbamoyl-(C₁-C₆ alkyl), mercapto-(C₁-C₆ alkyl), indolyl-(C₁-C₃ alkyl), phenyl-(C₁-C₃
5 alkyl), hydroxyphenyl-(C₁-C₆ alkyl), halophenyl-(C₁-C₆ alkyl), imidazolyl-(C₁-C₆ alkyl),
6 phenyl, and sulfoximino-(C₁-C₆ alkyl).

1 **150.** The method of claim 143 in which R³ is a member selected from the
2 group consisting of C₁-C₄ alkyl, hydroxy -(C₁-C₂ alkyl), carboxy-(C₁-C₂ alkyl), amino-(C₃-C₅
3 alkyl), guanidino -(C₂-C₄ alkyl), carbamoyl-(C₁-C₂ alkyl), mercapto-(C₁-C₂ alkyl),
4 methylthio-(C₁-C₃ alkyl), indolylmethyl, phenyl-(C₁-C₂ alkyl), and hydroxyphenyl-(C₁-C₂
5 alkyl).

1 **151.** The method of claim 143 in which R¹ is CH₂, R² is N, and R³ is a
2 member selected from the group consisting of C₁-C₄ alkyl, hydroxy -(C₁-C₂ alkyl), carboxy-
3 (C₁-C₂ alkyl), amino-(C₃-C₅ alkyl), guanidino -(C₂-C₄ alkyl), carbamoyl-(C₁-C₂ alkyl),
4 mercapto-(C₁-C₂ alkyl), methylthio-(C₁-C₃ alkyl), indolylmethyl, phenyl-(C₁-C₂ alkyl), and
5 hydroxyphenyl-(C₁-C₂ alkyl).

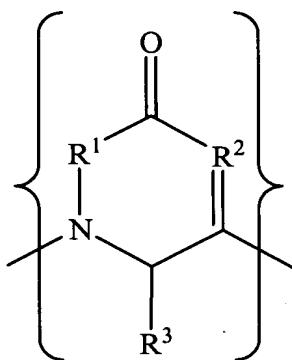
1 **152.** The method of claim 143 in which said peptide analog is a peptide in
2 which two or more non-adjacent amino acids are replaced by azacyclohexenone groups of
3 said formula.

1 **153.** The method of claim 143 in which said peptide analog is a peptide in
2 which, in at least a portion thereof, every second amino acid is replaced by an
3 azacyclohexenone group of said formula, and the number of said azacyclohexenone groups in
4 said peptide analog is two or more.

1 **154.** The method of claim 143 in which the total number of amino acids and
2 azacyclohexenone groups in said peptide analog is from 3 to 200.

1 **155.** The method of claim 143 in which the total number of amino acids and
2 azacyclohexenone groups in said peptide analog is from 4 to 20.

1 **156.** A method for extracting a target peptide having a selected amino acid
2 sequence from a mixture of peptides, said method comprising contacting said mixture with a
3 capture peptide that is covalently bonded to a solid support and associates with said amino
4 acid sequence in a β -sheet interaction, said capture peptide comprising amino acids and at
5 least one azacyclohexenone group having the formula



6 in which:

7 R¹ is CH₂ or NH,

8 R² is CH or N, and

9 R³ is H or an amino acid side chain,

10 such that in at least one such azacyclohexenone group:

11 when R¹ is CH₂ and R² is CH, R³ is an amino acid side chain, and

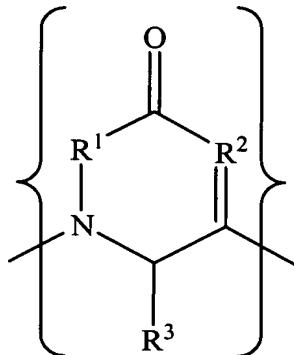
12 when either R¹ is NH, or R² is N, or R¹ is NH and R² is N, R³ is H or an amino
13 acid side chain,

14 and when said peptide analog contains two or more azacyclohexenone groups of said
15 formula, R¹, R², and R³ of any one azacyclohexenone group in said peptide analog are either
16 the same as or different from R¹, R², and R³ of any other azacyclohexenone group in said
17 peptide analog,

18 to achieve a β -sheet-like interaction between said target peptide and said capture analog.

1 **157.** A method for extracting a target peptide having a selected amino acid
2 sequence from a mixture of peptides, said method comprising contacting said mixture with a

3 capture peptide that is covalently bonded to a solid support and associates with said amino
4 acid sequence in a β -sheet interaction, said capture peptide comprising amino acids and at
5 least one azacyclohexenone group having the formula



6
7 in which:

8 R^1 is CH_2 or NH ,
9 R^2 is CH or N , and
10 when R^1 is CH_2 and R^2 is CH , R^3 is an amino acid side chain, and
11 when either R^1 is NH , or R^2 is N , or R^1 is NH and R^2 is N , R^3 is H or an amino
12 acid side chain,
13 and when said peptide analog contains two or more azacyclohexenone groups of said
14 formula, R^1 , R^2 , and R^3 of any one azacyclohexenone group in said peptide analog are either
15 the same as or different from R^1 , R^2 , and R^3 of any other azacyclohexenone group in said
16 peptide analog,
17 to achieve a β -sheet-like interaction between said target peptide and said capture analog.

1 **158.** The method of claim 157 in which R^1 is CH_2 and R^2 is N .

1 **159.** The method of claim 157 in which R^1 is NH and R^2 is CH .

1 **160.** The method of claim 157 in which R^1 is NH and R^2 is N .

1 **161.** The method of claim 157 in which R^1 is CH_2 and R^2 is CH .

1 **162.** The method of claim 157 in which said azacyclohexenone group is an
2 L-stereoisomer relative to R^3 when R^3 is an amino acid side chain.

1 **163.** The method of claim 157 in which R^3 is a member selected from the
2 group consisting of C_1 - C_6 alkyl, C_1 - C_6 alkyl interrupted by $-O-$, C_1 - C_6 alkyl interrupted by
3 $-S-$, hydroxy-(C_1 - C_6 alkyl), carboxy-(C_1 - C_6 alkyl), amino-(C_1 - C_6 alkyl), guanidino-(C_1 - C_6

4 alkyl), carbamoyl-(C₁-C₆ alkyl), mercapto-(C₁-C₆ alkyl), indolyl-(C₁-C₃ alkyl), phenyl-(C₁-C₃ alkyl), hydroxyphenyl-(C₁-C₆ alkyl), halophenyl-(C₁-C₆ alkyl), imidazolyl-(C₁-C₆ alkyl), phenyl, and sulfoximino-(C₁-C₆ alkyl).

1 **164.** The method of claim 157 in which R³ is a member selected from the
2 group consisting of C₁-C₄ alkyl, hydroxy-(C₁-C₂ alkyl), carboxy-(C₁-C₂ alkyl), amino-(C₃-C₅ alkyl), guanidino-(C₂-C₄ alkyl), carbamoyl-(C₁-C₂ alkyl), mercapto-(C₁-C₂ alkyl), methylthio-(C₁-C₃ alkyl), indolylmethyl, phenyl-(C₁-C₂ alkyl), and hydroxyphenyl-(C₁-C₂ alkyl).

1 **165.** The method of claim 157 in which R¹ is CH₂, R² is N, and R³ is a
2 member selected from the group consisting of C₁-C₄ alkyl, hydroxy-(C₁-C₂ alkyl), carboxy-(C₁-C₂ alkyl), amino-(C₃-C₅ alkyl), guanidino-(C₂-C₄ alkyl), carbamoyl-(C₁-C₂ alkyl), mercapto-(C₁-C₂ alkyl), methylthio-(C₁-C₃ alkyl), indolylmethyl, phenyl-(C₁-C₂ alkyl), and hydroxyphenyl-(C₁-C₂ alkyl).

1 **166.** The method of claim 157 in which said capture peptide is a peptide in
2 which two or more non-adjacent amino acids are replaced by azacyclohexenone groups of
3 said formula.

1 **167.** The method of claim 157 in which said capture peptide is a peptide in
2 which, in at least a portion thereof, every second amino acid is replaced by an
3 azacyclohexenone group of said formula, and the number of said azacyclohexenone groups in
4 said peptide analog is two or more.

1 **168.** The method of claim 157 in which the total number of amino acids and
2 azacyclohexenone groups in said capture peptide is from 3 to 200.

1 **169.** The method of claim 157 in which the total number of amino acids and
2 azacyclohexenone groups in said capture peptide is from 4 to 20.